

**WELSH PAEDIATRIC
CRITICAL CARE
SERVICE**

**ANNUAL REPORT
2007**

SUMMARY

- 325 children were admitted to the unit during the year 2007.
- In the year 2007, the retrieval team agreed to 110 requests for retrieval.
- Two retrievals were refused due to the lack of an available staffed bed during the winter period of peak demand.
- The development of the Paediatric Critical Care Network has continued with multidisciplinary audit and feedback sessions held in all Trusts.
- The partnership between the Lead Centre PICU and the Welsh Burns Centre in Morriston Hospital continues.
- The UK Paediatric Intensive Care Audit Network Database (PICANet) has published its fifth report (www.picanet.org.uk).

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CHAPTER 1

THE LEAD CENTRE PAEDIATRIC INTENSIVE CARE TEAM

Dr Helen Fardy	Lead Clinician	Paediatric Critical Care Service
Mrs Paula Davies	Lead Nurse	Paediatric Critical Care Service
Dr Rim Al-Samsam	Consultant in Paediatric Intensive Care	- responsible for Audit and Research
Dr Malcolm Gajraj	Consultant in Paediatric Intensive Care	- responsible for Education and Training
Dr Damian Pryor	Consultant in Paediatric Intensive Care	- responsible for Clinical Risk
Dr Mark Price	Consultant in Paediatric Intensive Care/Anaesthesia	- responsible for Anaesthetic Training
Dr Allan Wardhaugh	Consultant in Paediatric Intensive Care	- responsible for Unit and Retrieval Audit
Dr Michelle Jardine	Consultant in Paediatric Intensive Care	
Ms Alison Oliver	Regional Training & Development Co-Ordinator for Paediatric Critical Care Services in Wales	
Mrs Catherine Maddern	Directorate Manager	Critical Care Services
Miss Mererid Jones/ Miss Kate Williams	Senior Physiotherapists	
Mrs Kath Singleton	Dietician	
Zoë Taylor	Pharmacist	
Mrs Pat Davies	Personal Assistant to Lead Clinician	
Sonia Mancisidor	Secretary	
Sue Tullett	Audit Clerk	

CONTACT NUMBERS:

Dedicated Retrieval Line	Tel:	029 20745413
Consultant via long range bleep	Tel:	029 20747747 (via switchboard)
Pat Davies PA to Dr Helen Fardy	Tel:	029 20746423
Email:		Pat.Davies@Cardiffandvale.wales.nhs.uk

CHAPTER 2

THE SERVICE

Our service has been developed based on multidisciplinary teamwork both within the Lead Centre and with our Paediatric, Anaesthetic and Emergency Medicine colleagues in the District General Hospitals throughout Wales.

Consultant Staff

As a result of progression in the implementation of the new consultant contract, we have appointed a seventh consultant, Dr Michelle Jardine. Michelle joins us following a training programme at Great Ormond Street Hospital. The future depends on plans for relocating the unit within Phase 2 of the Children's Hospital for Wales, which is currently in progress.

Specialist Registrars

The Paediatric Intensive Care Unit has a dedicated rota of resident specialist registrars – four from the Welsh Paediatric Rotation and one from the Welsh Anaesthetic Rotation. This provides an important part of the training of paediatricians and anaesthetists of the future.

Training is provided in the recognition and care of the critically ill child, as well as safe transport of the critically ill child (the principles of which are transferable to adult and neonatal practice).

A key component of a centralised service is the requirement for resuscitation and stabilisation locally, prior to retrieval by PICU. It is therefore essential that junior staff, the consultants of the future, learn about critically ill children during their time in PICU. Much of this knowledge will be gained from direct experience managing patients, but given the limited time, shift working and variable patient numbers, this experience must be backed up by a rigorous educational programme.

Our junior staff are provided with guidelines and a self-directed programme, still in development, but which has been well received by the specialist registrars. This encourages independent study and strengthens understanding. Teaching ward rounds and a formal grand round once a week provide practical and specific knowledge, backed up by weekly tutorials on a wide curriculum pertinent to PICU.

Advanced airway skills are essential to medical staff working in intensive care. Without a patent and secure airway, all other medical interventions become irrelevant.

At the start of their attachment trainees attend a lecture and practical tutorial utilizing training mannequins. This helps emphasize the difference in anatomy, technique and equipment between infants, children and adults.

Paediatric trainees then spend time with a consultant anaesthetist, in the operating theatre. Here a range of airway management techniques, including endotracheal intubation, can be taught under close senior supervision and monitoring.

Theatre attachments used are those with exposure to multiple cases that require more involved airway management. A good example is day case Ear, Nose and Throat surgery. To maximize training both adult and paediatric lists, without any other trainees, are utilized.

The feedback from our trainees has been positive.

However, due to the changes in the anaesthetic training programme, it is becoming increasingly difficult to organise these attachments as it will interfere with the training of the anaesthetic trainees.

We would like to thank all the anaesthetic consultants involved for their time and interest.

Recruitment of specialist registrars from both paediatric and anaesthesia has proven difficult over the past year and we are working with the Regional Advisors and Medical Director to try and address this.

Nursing Staff

Lead Nurse for PICU – Paula Davies

2007/2008 has produced another year of growth and development within the PIC nursing team. Since the service developed in 1999, the nursing team has advanced and this year our turnover rate is around 8% demonstrating a fairly stable workforce.

During the past year we have committed ourselves to an increased number of staff undertaking PIC training. The unit has led in the way in the United Kingdom, in delivering the PIC training in a more flexible and efficient manner. Further information on this initiative is available from our Regional Training Nurse. The flexible course allows us to increase the number of our training places, which has had a positive effect on how the service meets the Standards for critically ill children in Wales. By the end of this summer, 46% of our nursing team will be trained in PICU, with 99% trained in child health. This represents a major improvement in meeting the standards, and provides the platform for the continued commitment to deliver this highly specialised training in this way.

So, another year over and we continue to develop the service for critically ill children in Wales. We look forward to continued commitment in ensuring every critically ill child in Wales truly has a first class service.

Pharmacy Report

Postholder – Ms Zoë Taylor Clinical pharmacy role on PICU

A specialist clinical pharmacist visits PICU every day Monday to Friday. Their role is to promote the safe and effective use of medicines. All medications for every child are reviewed daily to check that they are appropriate for the age, weight and clinical condition of the child. The pre admission drug history will be checked with the parent/carer, GP or referring hospital.

Throughout the child's stay on PICU the pharmacist will advise on:

- Therapeutic drug monitoring,
- Drug dose adjustments in renal and hepatic failure
- Drug interactions
- Suspected adverse reactions to drugs
- Formulations of medicines
- IV compatibility issues
- Parenteral nutrition

The pharmacist will also provide advice in the preparation of guidelines and protocols, help with drug related audits, review any medication incidents and help with education and training.

To ensure as seamless care as possible, the pharmacist will contact the paediatric pharmacist from the ward or referring hospital that the child returns to once they leave PICU to hand over any pharmaceutical issues and answer any questions.

The pharmacist's role is to work as part of the multidisciplinary PICU team to ensure the best care possible for our patients.

The Physiotherapy Service

Postholders – Miss Mererid Jones (on maternity leave – covered by Miss Kath Ronchetti) Miss Kate Williams

The specialist physiotherapy service to the unit this year has been led by Kath Ronchetti (Band 6) Respiratory Paediatric Physiotherapist and Kate Williams (Band 7) Trauma and Orthopaedic Paediatric Physiotherapist, between the hours of 08:00 hours – 16:30 hours, Monday - Friday. Emphasis has been placed on ensuring input from other specialist Paediatric Senior Physiotherapists where indicated, e.g. Oncology, Spines, Neurology. This has enabled more staff to be confident on PICU and allowed a smooth transition of patient care from PICU to the children's wards.

This year, teaching sessions for newly appointed nurses and SpRs regarding the role of Physiotherapy has continued. Teaching sessions on the management of unstable spines, covering practical and theoretical aspects have been attended by both Medical and Nursing staff. An unstable spinal checklist developed by the Physiotherapists has been implemented by the nursing staff on PICU. Teaching has also taken place to ensure Senior Staff nurses and SpRs are confident in performing the new NBL (bronchial lavage) procedure on paediatric patients. This has involved both theoretical and practical sessions on patients and also development of the appropriate paperwork to cover this.

There is also ongoing clinical education for the Physiotherapy staff to ensure consistent standards of Physiotherapy across the 24 hour period. Physiotherapy is provided on Saturday, Sunday and Bank Holidays via an emergency duty rota 9am- 4.30 pm and a bleep service between 16:30 hours and 08:30 hours (with a scheduled evening service 19:00 hours – 22:00 hours).

Dietitian's Report

Postholder – Mrs Kath Singleton

Nutrition and dietetic advice is provided 5 days a week with every child on the PICU and PHDU receiving a review. There is an on-call service available on Bank Holidays and weekends. An analytical software programme has been in operation for several years. This has benefited the unit by streamlining the provision of enteral feeds, allowing a profile of macro and micro nutrients of all enteral feeds to be given on request. This ensures that the child's nutritional requirements are being met. On PHDU, encouragement is given to work towards and achieve the child's usual feeding regimen. The rolling educational programme continues which highlights the importance of nutrition. The dietician continues to liaise with colleagues both within and outside the Trust to guarantee a seamless service.

Family Bereavement Support

Laura Thomas, Sister - PICU

Family support continues to be a priority within PICU. We work closely with the nurse counsellors and Trust Bereavement Officer to help our families through some very difficult times.

The annual memorial service continues to go from strength to strength. This year we decided to focus more heavily on the bereaved siblings with renditions of Jingle Bells and plenty of chocolate.

We have also purchased a book of remembrance and glass cabinet with money which was kindly donated to us. This will enable families to make an entry along with a photograph which they can come and see in the chapel whenever they wish.

CHAPTER 3

THE REGIONAL PAEDIATRIC CRITICAL CARE SERVICE

Regional Education and Training Report

Alison Oliver

Regional Training and Development nurse for PIC Services in Wales

Visits continued across Wales providing training and education concentrating on non invasive ventilation training this year as more District General Hospitals are being requested to attempt this prior to the child requiring retrieval.

The Gwent trust ran a Paediatric High Dependency (PHDU) study day this year which staff from the Paediatric Critical Care Service contributed to. It was well attended and evaluated very well.

Feedback regarding retrieval and regional services at all trusts has been ongoing and has brought up the familiar issues of high dependency care and care of the level one child. Discussions regarding the care for critically ill children with burns continue.

Reconfiguration of services for all colleagues in the network is ongoing with some decisions progressing this year. The newly developed network group (previously the Paediatric Intensive Care Advisory Group) for critically ill children has met on three occasions in South Wales to progress and audit the work for this group of patients. Work is ongoing on Care Bundles, Promotion of the Tanner Report and audit of the Standards for Critically Ill children.

The commitment of senior nurses to their staff still enabled visitors to attend days on the PIC unit working alongside myself, despite lack of funding. The feedback has been positive and it is hoped that these opportunities will continue. North Wales have been visited this year and their services discussed. One trust is planning to utilise the informal visits in Cardiff in the New Year however, Alder Hey remains the lead centre for the North Wales Children.

Foundation in Caring for the Acutely ill Child Courses ran in both Cardiff and Swansea in 2007. This Autumn, external nurse training has been somewhat neglected due to an exciting development, the commencement of the BSc in Dimensions in Health Care in Paediatric Intensive Care at the University Hospital of Wales in partnership with Birmingham City University. The Regional T & D Nurse's commitment to it as an honorary tutor has meant less hours available for the network this year.

Teaching commitments also continue to the MSc in critical care and the pre registration training courses.

Meeting the requirements of the standards will be difficult for staff as the APLS course is currently being redeveloped and will not be available until Spring/Summer of 2008 once ALSG have confirmed its format. EPALS is still available at Merthyr NHS trust and Carmarthen NHS Trust for those staff that wish to refresh sooner.

EDUCATION – Dr Malcolm Gajraj

The Tanner report

http://www.dh.gov.uk/Consultations/ClosedConsultations/ClosedConsultationsArticle/fs/en?CONTENT_ID=4124412&chk=IIVmJg

was published towards the end of 2006 and has widespread implications for paediatrics throughout the region, with a requirement for paediatric resuscitation skills not only to be learned, but maintained and utilised at times of need. No group is exempt from these requirements and Paediatric intensive care is no exception. With us lies a responsibility to provide support for clinicians involved in resuscitation and stabilisation, from the point of referral until the retrieval team arrives. However, this process is not one of merely providing telephone advice and clinical guidance, it involves making available the facilities to provide and maintain the skills needed by those involved in paediatric resuscitation and stabilisation. This must be through educational initiatives and programmes, in addition to the training of paediatricians and anaesthetists who rotate through PICU as junior staff.

To this aim, we have in the past provided the Stabilisation course. This year however, demand was insufficient to run the course, although we will look to reinstate this. It is clear though that individuals are looking for input and the forthcoming study day in May is oversubscribed. In addition, several hospitals in the region have had input into their in-house educational programmes from PICU staff members.

PICU has contributed to education in the wider scheme as well. Dr Malcolm Gajraj, along with Dr Colin Powell of the Department of Child Health, developed and delivered a new module in the Cardiff University MSc in Child Health: *Care of the Critically Ill Child*. This was appraised extremely well and will feature in course in future years. Dr Malcolm Gajraj and Ms Alison Oliver have also continued to contribute to the Cardiff University MSc course in a teaching capacity, with both becoming dissertation supervisors. In addition, Dr Malcolm Gajraj has a role as a tutor for the Child Health MSc course.

Medical students continue to benefit from PICU input, with a contribution this year to the SCC programme. Dr Allan Wardhaugh continues to provide first year students with project work and for the first time, fourth year students undertaking child health attachments in UHW attend formal teaching in PICU, which aims to reinforce lecture that remains part of the introductory schedule at the start of each block.

We have been involved with training for anaesthetists, emergency doctors and paediatricians. Our influence has also extended to a paediatric study afternoon for general practitioners in the Caerphilly district, the feedback from which was highly encouraging; we know that good outcomes require recognition and action at all levels and it is heartening that our colleagues in primary care consider this aspect of their work to be so important.

Of course, education for medical staff is only a part of the picture. Cardiff has been proud to deliver the first satellite course for paediatric critical care nursing, in conjunction with the University of Central England. Moreover, this has increased the opportunities for multidisciplinary learning, with PICU SpRs and PICU nurses sharing teaching sessions, with good feedback so far.

Finally, the Cardiff PICU was one of six studied in a survey of education for PICU trainees in the UK, the results of which were disseminated in the national UKPICS meeting in September. This survey revealed that although changes to delivery could be made, overall, our trainees were getting a high level of input and reported high levels of satisfaction, consistent with the evidence gathered directly from them in-house.

The following contact numbers may be of use to staff that need access to courses outlined in the Standards:

Resuscitation Officer – Gwent APLS	Linda Jones Royal Gwent Hospital Newport Tel: 01633 234234
Resuscitation Co-ordinator APLS	Kate Graham University Hospital of Wales Cardiff Tel: 029 20748297
Resuscitation Officer APLS/PALS	Cheryl Thomas Ysbyty Gwynedd Bangor Tel: 01248 384384
Resuscitation Officer- PALS	Harry Stephens Prince Charles Hospital Merthyr Tel: 01685 721721
Resuscitation Officer	David Edwards Wrexham Maelor Hospital Wrexham Tel: 01978 727409
Child Health Education	Jane Davies Eastgate House Newport Road Cardiff Tel: 029 20927732
Child Health Education	Jo John University of Swansea Sketty Road Swansea Tel: 01792 295789

REGIONAL NETWORK MEETINGS

The following table shows the details of all the Study Days, Multidisciplinary and Nursing Meetings held:

HOSPITAL	Multi- Disciplinary Visit	Nursing/ Medical Visits	Full Study Days
Singleton Hospital	21 Mar 07		
Morrison Hospital	21 Mar 07	9 May 07	
Royal Glamorgan Hospital	17 May 07	4 May 07	18 June 07
Princess of Wales Hospital	18 Oct 07		20 Feb 07 17 Apr 07
West Wales General Hospital	28 Nov 07	23 May 07	30 July 07
Withybush General Hospital	11 Oct 07	23 May 07	12 July 07
Prince Phillip Hospital			
Neath/Port Talbot Hospital			
Prince Charles Hospital	1 Oct 07		
Nevill Hall Hospital	28 Mar 07		
Bronglais Hospital	16 Aug 07	4 June 07 7 Dec 07	17 July 07
Brecon Memorial Hospital			
Royal Gwent Hospital	25 Oct 07	11 Jan 07	
Glan Clwyd Hospital	N/A	27 Sept 07	
Ysbyty Gwynedd Hospital	N/A	27 Sept 07	
Wrexham Maelor Hospital	N/A	27 Sept 07	
Alder Hey Hospital	N/A		

As can be seen from the table, multidisciplinary meetings have been held with all our referring hospitals. These have enabled clinicians to clarify issues in relation to the service and make suggestions on future developments as well as providing the opportunity to discuss referred/retrieved patients. These meetings will continue on a yearly/twice yearly basis depending on the number of referrals from each hospital.

Future Plans for the Network

Each PICU Consultant is linked to a group of hospitals. He/She is responsible for arranging the joint audit and feedback session at that hospital. Following a recent internal reorganisation, the link consultants have changed.

HOSPITAL	DGH LINK	PICU LINK TO APRIL 2007	PICU LINK FROM APRIL 07
Singleton Hospital	Ingo Scholler	Rim Al-Samsam	Malcolm Gajraj
Morrison Hospital	Rachel Evans/ Wynne Rogers	Rim Al-Samsam	Malcolm Gajraj
Royal Glamorgan Hospital	Lynne Millar-Jones	Damian Pryor	Allan Wardhaugh
Prince Charles Hospital	David Deekollu	Damian Pryor	Allan Wardhaugh
Princess of Wales Hospital	Nirupa d'Souza	Damian Pryor	Malcolm Gajraj
Bronglais Hospital	John Williams	Allan Wardhaugh	Mark Price
West Wales Hospital	Vinay Saxena	Allan Wardhaugh	Mark Price
Withybush Hospital	Gustav Vas Falcao	Allan Wardhaugh	Mark Price
Prince Phillip Hospital	via West Wales	Allan Wardhaugh	Mark Price
Neath/Port Talbot Hospital	via Singleton	Rim Al-Samsam	Malcolm Gajraj
Nevill Hall Hospital	Marcus Pierrepoint	Malcolm Gajraj	Michelle Jardine
Royal Gwent Hospital	Marion Schmidt	Malcolm Gajraj	Michelle Jardine

Dr Rim Al-Samsam, Dr Damian Pryor and Dr Fieke Slee-Wijffels will work with Alison Oliver in the further development and running of the 'Stabilisation Study Day'. We have been fortunate as a service to receive significant amounts of money due to the generosity of the families and friends of our patient. We are therefore in the process of purchasing a simulator which will aid enormously with our training days.

Children & Young People's Specialised Services Project (CYPSS)

We, in line with paediatric colleagues across Wales continue to work with the CYPSS with the aim of developing the "informal" network we have set up over the past 6 years from the lead centre into a formal Managed Clinical Network.

The existing All Wales Paediatric Critical Care Group has been revamped and now has North Wales and South Wales sub groups. The South Wales Group have met on 11th May and 9th July 2007 and on the 13th March 2008. The table below outlines representation of the group :

Helen Fardy	Lead Clinician	PICU
Paula Davies	Lead Nurse	PICU
Alison Oliver	Regional Training & Development Nurse	PICS in Wales
Marcus Pierrepoint	DGH Link Paediatrician	South East (nominated by WPS)
Eryl Owen	DGH Link Nurse	South East (nominated by Senior Nurse Forum)
Vishwa Narayan	DGH Link Paediatrician	South West (nominated by WPS)
Eirlys Thomas	DGH Link Nurse	South West (nominated by Senior Nurse Forum)
Lloyd Harding	Adult ITU Consultant	WICS Representative
Grant McFadyen	Consultant Paediatric Anaesthetist	PAGW Representative
Vicky Goodwin	Consultant A & E	Prince Charles Hospital
TBA	Ambulance Representative	Nomination awaited via HCW
TBA	Contact a Family parent representative	Nomination awaited via HCW
TBA	MCN Co-ordinator	HCW/WAG
Pat Davies	PA to Dr H Fardy	Admin Support

Helen Fardy has organised a one day conference on behalf of the network "The DGH and the Critically Ill Child". This will be held on the 8th May 2008.

CHAPTER 4

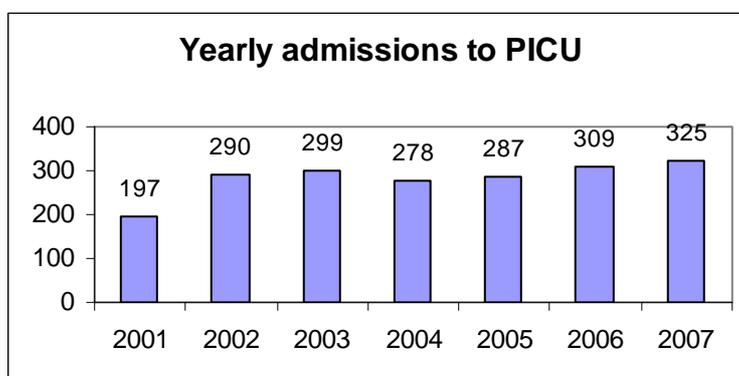
UTILISATION OF THE LEAD CENTRE PAEDIATRIC INTENSIVE CARE UNIT

PICU inpatient activity

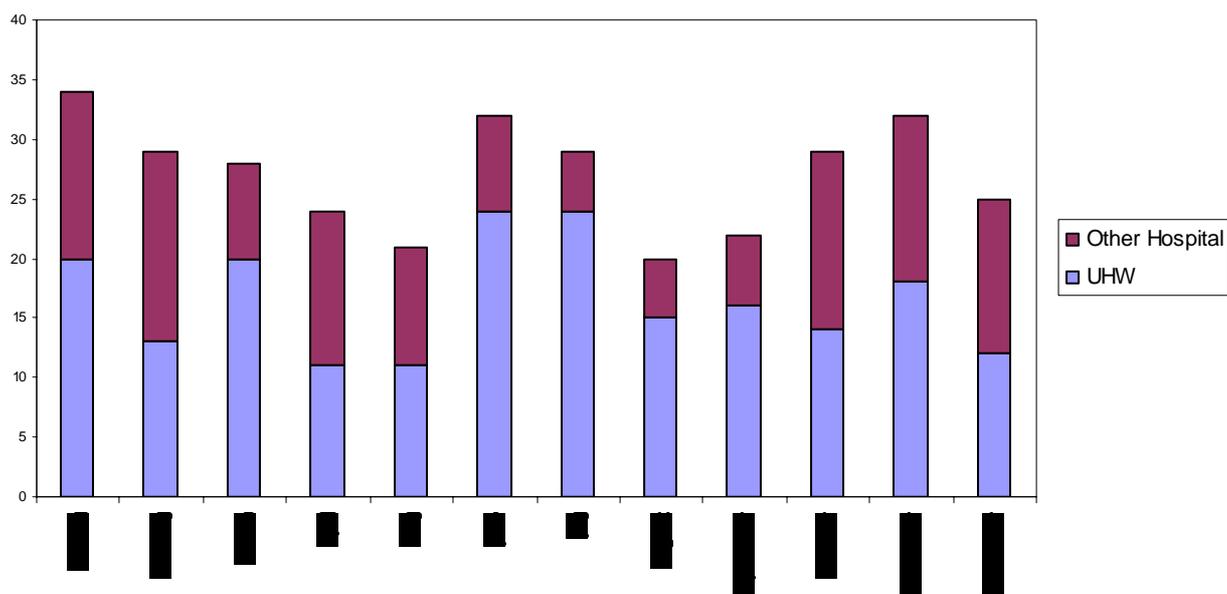
The data presented here are those for the period 1st January – 31st December 2007.

Overall admissions

A total of 325 patients were admitted to PICU, an increase of 22 in the last report.

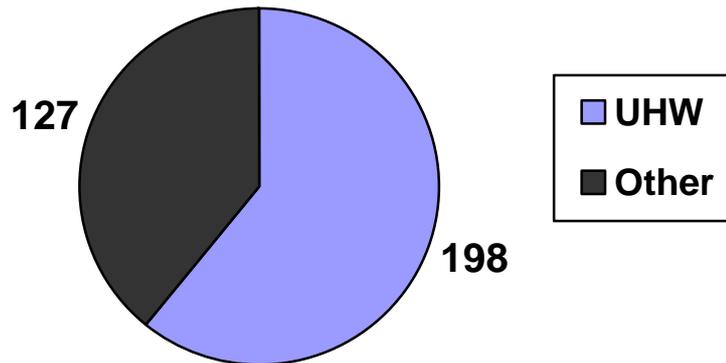


The monthly admission figures are shown below.

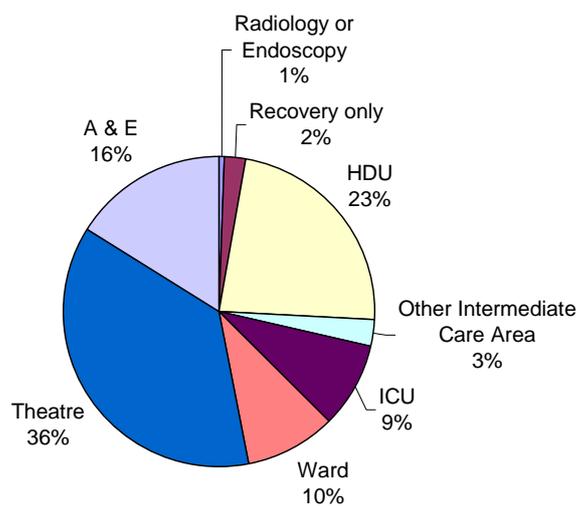


Source of admission

The proportion of admissions from other hospitals is up on last year, reversing a trend seen in the previous 5 years.

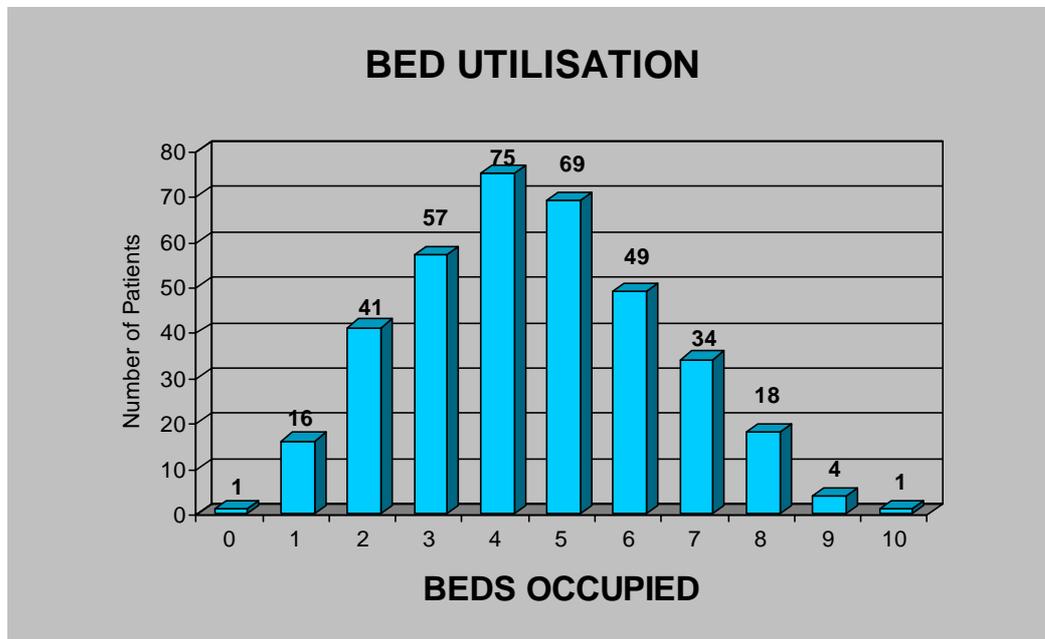


Care area admitted from



BED OCCUPANCY

Occupancy is shown below. Again, this reflects the marked winter peak in admissions.



The occupancy figures are often below 60% during the summer months, but this is a consequence of the need to accommodate seasonal swings in demand. The unit remains commissioned for 6 beds and an additional bed to allow a retrieval with the flexibility to expand to 8 beds with an additional retrieval bed.

The above graph shows the number of patients on the unit in any one day and the number of days in the year this occurred. On 23 days there were more than 7 patients and on 34 days there were exactly 7 patients. Without flexibility the unit would have been closed on 57 days. Two patients were refused during this year due to lack of an available staffed bed.

Length of stay

The median length of stay remains 2 days, with an interquartile range of 1 – 4 days. Some patients remain much longer – 15 patients had stays of 14 days or longer, and 2 patients had stays of over 60 days.

Outcomes

Crude mortality

There have been 12 deaths on PICU in the last year. This gives a crude mortality rate of 3.6%. The crude mortality in the last PICANet interim report for all participating units is 5%.

The crude mortality rate does not take account of illness severity and case-mix. This is adjusted for using the Paediatric Index of Mortality (PIM), from which a standardised mortality ratio (SMR) can be calculated. A SMR of less than 1 means there were fewer deaths than the PIM model predicted. The table below shows the SMR for the last 8 years data, and allows the calculation of the cumulative SMR for the unit.

Year	Crude mortality rate	SMR
1999-2000	5.60%	0.56
2000-2001	5.30%	0.63
2001-2002	3.80%	0.40
2002-2003	6.40%	0.63
2003-2004	6.80%	0.67
2004-2005	6.70%	0.58
2005	5%	0.64
2006	4.5%	0.74
2007	3.6%	0.66
Cum 05-07		0.66

PIM is inaccurate for calculating SMR if the number of expected deaths is less than 20, so the annual SMR is less reliable than the cumulative SMR. However, analyzing cumulative SMR over a long period of time may mask a relatively sudden change in mortality rate. PICANET data shows our cumulative SMR for 2005-2007 is 0.66.

The following graph is from the PICANet report 2008 giving a UK perspective of outcomes using PIM. Cardiff & Vale NHS Trust are letter C.

Figure 49c PICU Standardised mortality ratios by NHS trust with 99.9% control limits, 2007: risk adjusted (PIM2)

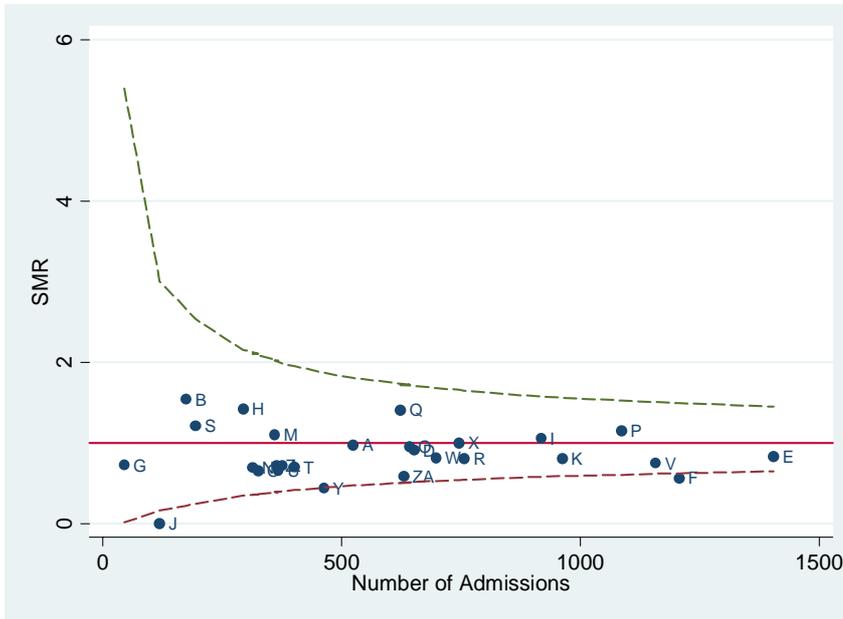
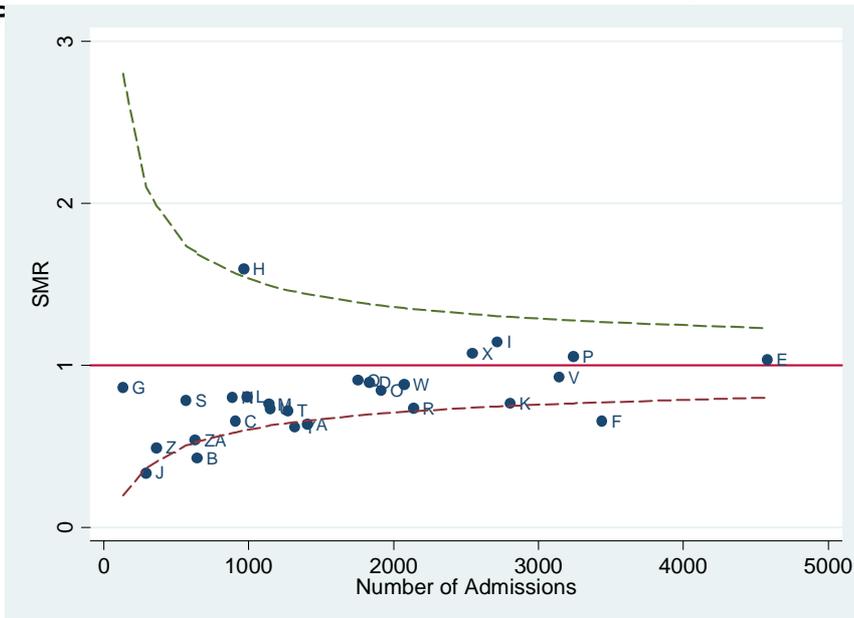
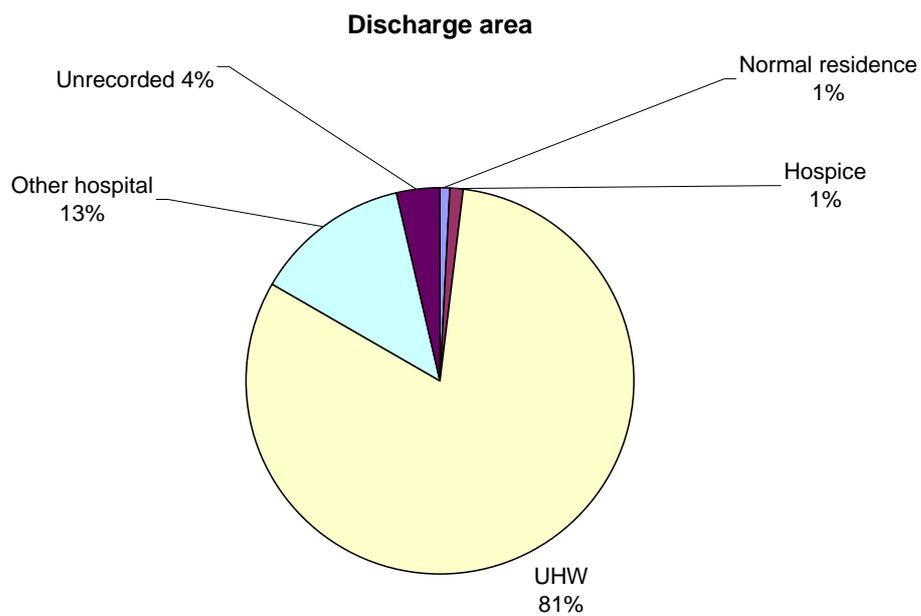


Figure 50b PICU Standardised mortality ratios by NHS trust with 99.9% control limits, 2005 - 2007 combined: risk adjusted (F)



Destination on discharge

Our aim is to discharge children back to their referring hospital as soon as possible. However, the majority are discharged to care within UHW, usually for continuation of tertiary input. There seems to be a trend against discharge to referring hospital.



CHAPTER 5

PAEDIATRIC HIGH DEPENDENCY CARE AT THE LEAD CENTRE

The PHDU continues to develop its service with ongoing planning to combine with the PICU in the second phase of the Children's Hospital for Wales.

During the last 12 months, the nursing team have worked flexibly across both PICU and PHDU to meet peak demands on the service. The PHDU has regularly needed to open additional beds to accommodate emergency referrals, urgent and elective surgery throughout the winter months.

The nursing team have developed further critical care skills and this has enabled service development to take place. An example of this is the introduction of non invasive ventilation to PHDU. Due to this some children [there are guidelines for criteria of use] have been cared for on CPAP and BIPAP on the PHDU.

The PICU and PHDU have a joint nursing education and training strategy and both teams now benefit from the Paediatric Intensive Care course being delivered flexibly at Cardiff [see PIC nursing chapter]. Several of the senior nursing staff will have undertaken PIC training by the end of this year which more than meets the standards for critically ill children in Wales in regard to PHDU provision.

The amalgamation of PICU and PHDU provides a high quality and efficient paediatric critical care service which will be operationally improved when the units are based in one area in the future.

CHAPTER 6

THE RETRIEVAL SERVICE



Retrieval and Transport activity

The consultant delivered retrieval service continues to perform well. There are 7 consultants delivering medical input, 14 nurses and 5 ambulance crew. Our commissioned remit is to be able to offer retrieval for 95% of the year. This is largely due to the good will of our nursing staff in providing cover for the service beyond their required commitment. We are continuing to train more nursing staff to undertake retrievals, so we should become less reliant on staff sacrificing their time off.

192 calls were made to the service to discuss retrieval, and 110 cases were retrieved by the PICU team. This is an increase in retrievals, and a disproportionately greater increase in referral calls compared to last year.

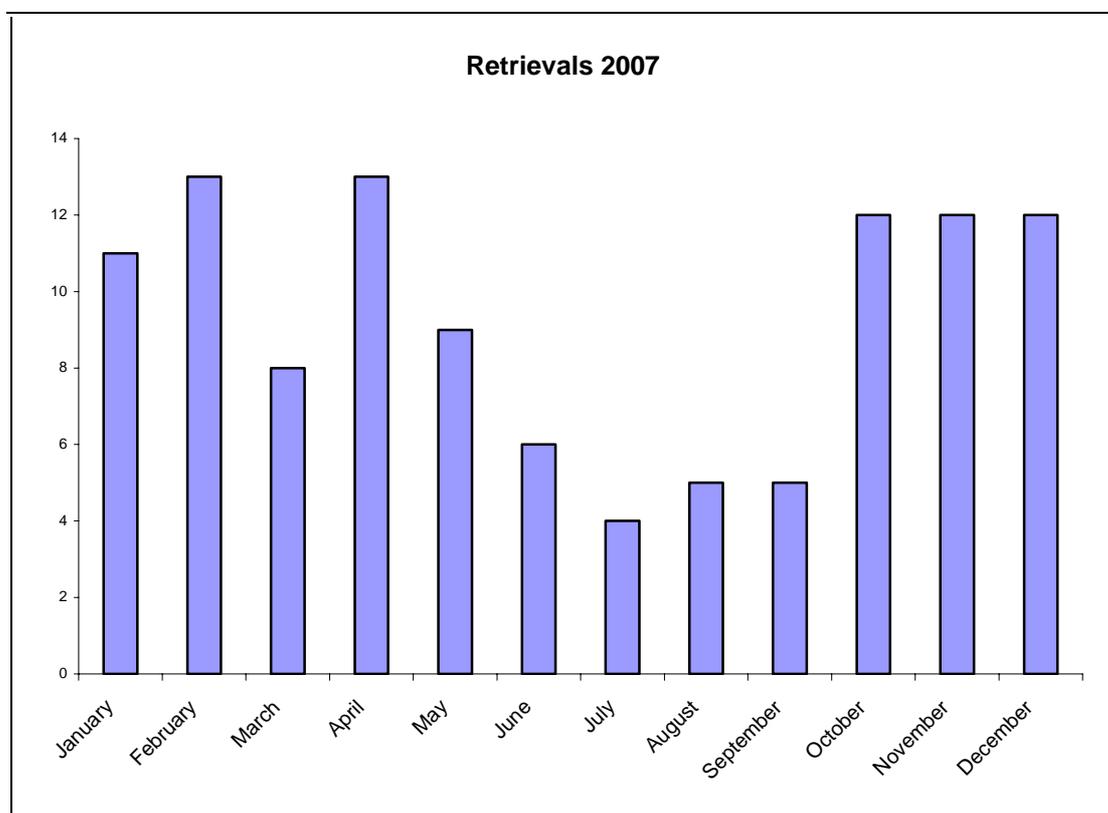
6 cases were transported to PICU by the referring hospital – 5 of these were patients with traumatic brain injury requiring urgent neurosurgery.

There were 2 refused retrievals from Welsh hospitals on consecutive days in February when the PICU was full. In one case the patient subsequently improved and did not require intensive care, and in the other, our Bristol colleagues retrieved the patient to their PICU. One patient was retrieved by the Bristol team, but brought here because of a lack of beds in Bristol, and one referral from Shrewsbury was declined on the basis of distance. The CATS team from North Thames transferred in a patient from Colchester, Essex in December as there were no PICU beds in the South or Midlands of England. Use of helicopter transfer for patients over such distances has been unusual, but we expect to have more requests if bed pressures in London and the South East persist.

	Retrieval by UHW	Retrieval refused - no team available	Retrieved by other PICU	Referring hospital transfers	Died before retrieval	Advice only - remains referring hospital	Grand Total
Patient episodes	110	2	2	6	4	68	192

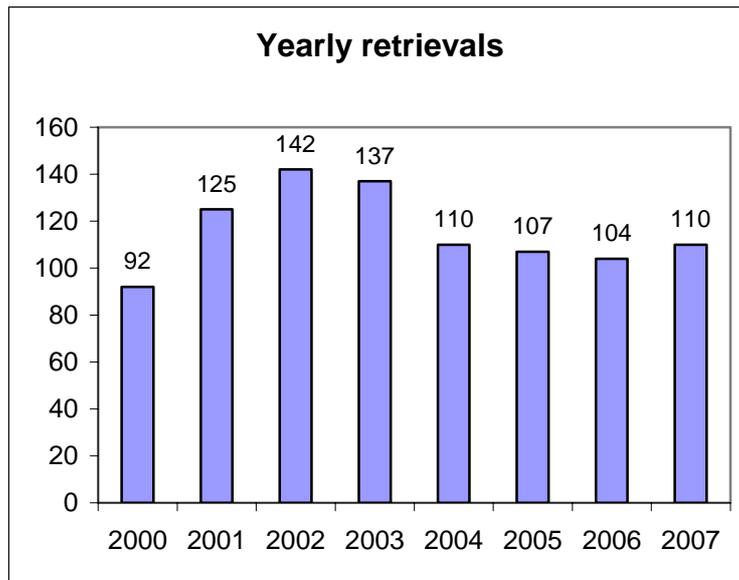
Seasonal variation

As with admissions to the unit, there is a marked peak in the winter months. This is seen nationwide, and is almost solely due to bronchiolitis in infants.



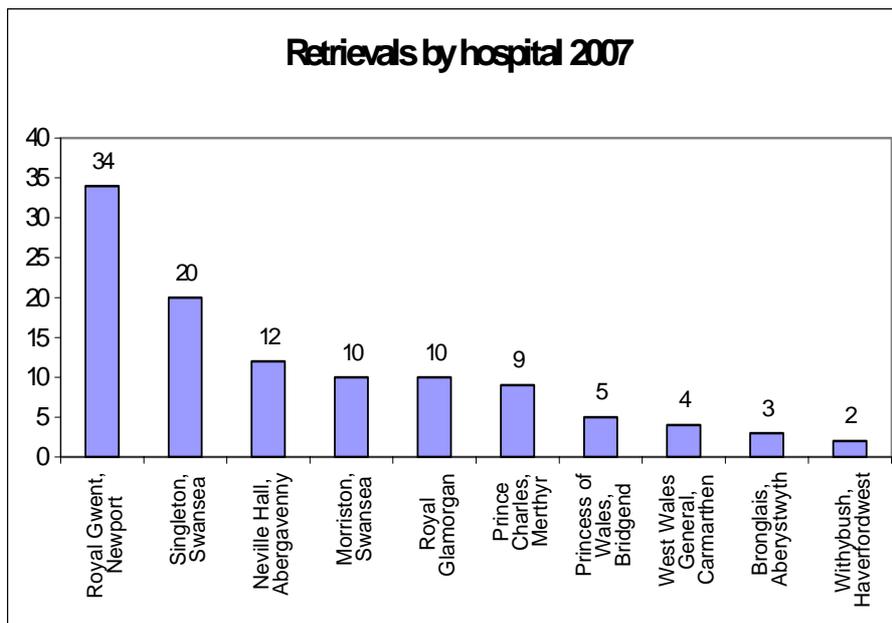
These figures reverse annual downward trend in retrievals in the last 5 years.

The decrease between 2003 and 2004 was partly explained by the closure of the inpatient paediatric unit at Llandough Hospital



Retrievals by hospital

The breakdown of retrievals for individual hospitals is shown below.



Three retrievals from hospitals in the West of England are not included.

CHAPTER 7

Clinical Governance **MARK PRICE**

The main aim of clinical governance activities is to continuously improve the quality of care delivered, the most important aspect being to minimise risk and improve safety in the complex environment of patient care.

Continuing initiatives include a monthly multidisciplinary critical care directorate review of all critical incidents in the preceding month. This allows a quicker analysis and feedback by staff directly involved in patient care. Another benefit is that it allows across the floor learning from incidents between the adult and paediatric sections of the directorate.

In summary there were 119 reports for the year starting at the beginning of June. The major change from the previous years was that only actual harm to the patient was scored. There is no longer any scoring for potential harm to individual or Trust.

In scoring degree of harm 73% of incidents fell into Category A (No adverse outcome) or B (Short term injury or damage) There were no incidents at Category D (Permanent injury) or E (Death)

The three largest categories of incident were due to:

- Medical device 24%
- Treatment 22%
- Medication 18%

New initiatives in the last year include the introduction of Zero Tolerance Prescribing and the Healthcare Foundations Safer Patient Initiative

The aim of Zero Tolerance Prescribing is to explicitly emphasise the importance of good prescribing practice as a component of a patients care. It has a clear set of rules that aim to minimise prescription error at source. It mandates administering nursing staff to question and refuse administration if the rules are not met and stresses the importance of avoiding distraction and interruption during the prescribing and administration process.

The Safer Patient Initiative is a multimodal approach to prioritise a safety culture in clinical practise and leadership. One aspect we hope to apply in 2008 is the introduction of 'Care Bundles' for central line placement.

CHAPTER 8

CLINICAL GOVERNANCE/AUDIT/RESEARCH

RIM AL-SAMSAM

Lead Centre Audit:

As part of the lead centre audit we continue to collect data for PICANet which are reported earlier in the document. Our retrieval service is continually audited and we have monthly clinical governance sessions as well as quarterly morbidity and mortality meetings in association with the paediatric department.

Research & Audit:

Completed Research Projects from Last Year:

- *Validation of the Cardiff and Vale Paediatric Early Warning System (C&VPEWS). Dawn Edwards, CVE Powell, BW Mason, A Oliver.*

Objective: To develop and validate a paediatric early warning system to identify children at risk of developing critical illness.

Design: Prospective cohort study.

Setting: Admissions to all paediatric wards at the University Hospital of Wales.

Outcome measures: Respiratory arrest, cardiac arrest, paediatric high dependency unit admission, paediatric intensive care unit admission, and death.

Results: Data was collected on 1000 patients. A single abnormal observation determined by the Cardiff and Vale Paediatric Early Warning System (C&VPEWS) had a 89.0% sensitivity (95%CI, 80.5 - 94.1), 63.9% specificity (95%CI, 63.8 - 63.9), 2.2% positive predictive value (95%CI, 2.0 - 2.3) and a 99.8% negative predictive value (95%CI, 99.7 - 99.9) for identifying children who subsequently had an adverse outcome. The area under the receiver operating characteristic curve for the C&VPEWS score was 0.86 (95% CI, 0.82 - 0.91).

Conclusion: Identifying children likely to develop critical illness can be difficult. The assessment tool developed from the Advanced Paediatric Life Support guidelines on identifying sick children appears to be sensitive but not specific. If the C&VPEWS was used as a trigger to activate a Paediatric Emergency Team to assess the child the majority of calls would be unnecessarily.

- **Bispectral Index asymmetry and COMFORT score in paediatric intensive care patients.**

Froom SR, Malan CA, Mecklenburgh JS, Price M, Chawathe MS, Hall JE, Goodwin N. Anaesthetics and Intensive Care Medicine, University Hospital of Wales, Cardiff CF14 4XW, UK. docfroom@ntlworld.com

BACKGROUND: The Bispectral Index (BIS) monitor has been suggested as a potential tool to measure depth of sedation in paediatric intensive care unit (PICU) patients. The primary aim of our observational study was to assess the difference in BIS values between the left and right sides of the brain. Secondary aims were to compare BIS and COMFORT score and to assess change in BIS with tracheal suctioning.

METHODS: Nineteen ventilated and sedated PICU patients had paediatric BIS sensors applied to either side of their forehead. Each patient underwent physiotherapy involving tracheal suctioning. Their BIS data and corresponding COMFORT score, assessment as by their respective nurses, were recorded before, during, and after physiotherapy.

RESULTS: Seven patients underwent more than one physiotherapy session; therefore, 28 sets of data were collected. The mean BIS difference values (and 95% CI) between left BIS and right BIS for pre-, during, and post-physiotherapy periods were 9.2 (5.9-12.5), 15.8 (11.9-19.7), and 7.5 (5.2-9.7), respectively. Correlation between mean BIS, left brain BIS, and right brain BIS to COMFORT score was highly significant ($P < 0.001$ for all three) during the pre- and post-physiotherapy period, but less so during the stimulated physiotherapy period ($P = 0.044$, $P = 0.014$, and $P = 0.253$, respectively).

CONCLUSIONS: A discrepancy between left and right brain BIS exists, especially when the patient is stimulated. COMFORT score and BIS correlate well between light and moderate sedation.

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Chosen and evaluated by the Faculty of 1000, Medicine

[Http://www.f1000medicine.com](http://www.f1000medicine.com), and rated as a key article for those in the sub-speciality.

Completed Non-Core Audit Project:

- *A Prospective Audit of the Management of Paediatric Sepsis on PICU. Part of a National Multi-centre Project run by the Paediatric Intensive Care Society.*

Aim: The purpose of this prospective observational study is to review current UK practice in the management of severe sepsis in children for two reasons. Firstly, if systematic deficiencies exist in the early management of sepsis, then it is important to define these in order to design interventions to improve care. Secondly, knowledge of current practice is necessary in order to inform any future randomised controlled trials of albumin, steroids or indeed any other agent in severe sepsis.

Methods: This 6-month study will focus on pre-PICU care in several areas of the UK and participating services will collect clinical information about the children presenting with severe sepsis who are referred to PICU. Information collected will include details of interventions, including airway management, ventilation, fluids, drugs and inotropic support given both before and after arrival at PICU. Severity of illness scoring will be performed using the PIM2 scoring system and outcome data will include PICU mortality and 28 day morbidity.

Results: Awaiting feedback from PICS

- *Medication Error on PICU (Re-Audit). Alison Oliver, Allan Wardhaugh.*

Background & Aims: Between February 2006 a series of three audits were undertaken on PICU with regard to medication errors. The aim of the initial audit was to assess the number of drug errors that occurred on PIC prior to the introduction of a Zero Tolerance Policy for prescription writing on PIC. In November 2007 a further audit was commenced after the introduction of some medication prescription and administration guidelines, known as Zero Tolerance Guidelines.

Method: All staff were asked to attend an hour session in preparation for the introduction of the policy. Once most staff had attended the audit was commenced. All drug charts were checked on at least a daily basis to record the number of errors detected by the unit pharmacist or the audit nurse. All other staff were welcome to complete audit forms if they detected an error or witnessed non compliance with the policy.

Results: During the first three phases in 2006 a total of 336 errors were recorded, 175 (52%) were administration errors and 161 (48%) were prescription errors. The Senior Nurse was identified as taking the nursing issues forward with the Unit pharmacist. All PICU nurses who administered IV medication were reassessed and a medical lead was identified for PICU to review and revise induction training on medication in PICU.

Post the teaching, reassessment and introduction of the **RULES** for Zero Tolerance the number of medication errors in the period 26/11/07 to 24/12/07 was reduced to only 27 errors. 12 were administration errors and 15 were prescription errors.

Recommendations: The audit will be re-launched in April 2008 on the PICU with a new group of medical staff. Number of episodes of administration will also be audited along with number of errors. The aim is to ensure that the rules are being adhered to and unit staff continue to be vigilant to prevent medication and administration errors.

- **Prospective Audit of Accidental Extubation on PICU. Oliver. A Regional Training & Development Nurse for PIC Services in Wales PIC.**

Background & Aims: Unplanned extubations are a recognised and often preventable occurrence in the paediatric intensive care unit. Incident reports highlighted that a number of children had suffered adverse events as a result of their unplanned extubation. A prospective audit of the children admitted to PICU from June 2006 to November 2007 was carried out. It aimed to identify any areas of practice which have contributed to their unplanned extubation and whether practice can be improved to prevent them occurring in the future.

Methods: All children admitted to PICU were included in the study. Staff were informed of the need to be vigilant and record all incidents on a specially devised audit form. The data was then analysed by a senior nurse.

Results: The audit took place over 18 months 17 children accidentally extubated

Most children were under 1 year and the majority had a primary respiratory diagnosis.

Only two of the 17 were not sedated on any medication at all, 9 of the children were on both analgesia and sedation intravenously when the incident occurred.

13 of these 17 children were of level 2 dependency and of those 13 required reintubation post extubation.

Four significant adverse events were recorded as critical incidents.

11 of the children were orally intubated

These findings were presented to the PIC management team.

Recommendations: The unit needs to benchmark against other PICU s in the UK to ensure that the numbers of accidental extubations are equitable with others.

The prospective audit needs to be ongoing so that practice can be monitored.

- **Bronchiolitis: a 3 year audit of PICU admissions. Thyagarajan N, Iqbal S, Gajraj M. PICU, University Hospital of Wales, Cardiff.**

Introduction: Bronchiolitis is a major source of admission to paediatric wards every winter, with a significant effect on PICU admissions. The trend is for increased admissions to PICU, although the reason is unknown. Possible explanations include an increase in survival of extremely premature babies; those with heart disease, or changes in clinical practice.

Aims: To determine risk factors in the patients admitted to PICU and to ascertain any differences in regional practice that might account for altered admission rates.

Methods: Retrospective data for two seasons were combined with prospective data for one. Demographics included gestational age at birth and presentation; referral hospital and CPAP usage; maternal smoking, breast feeding; and Synagis use were looked for prospectively only.

Results: 62 patients (8.9% of admissions) were ventilated for bronchiolitis. 44 (71%) were RSV positive. 29 (47%) were premature, mostly presenting at approximately 40 weeks post conceptual age. Admission rate per hospital varied over time. CPAP was not used universally before intubation. Apnoea was the commoner reason for intubation. Duration of respiratory support was a median (range) of 5 days. 5/21 mothers smoked and 3/21 babies were breast fed. 3 preterm qualified for Synagis and had vaccinations.

Conclusions: Bronchiolitis contributes to a significant proportion of admission. There has been a varied usage of CPAP among different units and overall CPAP usage has increased in the recent time.

New Non-Core Audit Projects:

- *Survey of the incidence, aetiology, treatment and outcome of children admitted to paediatric intensive care in refractory convulsive status epilepticus. National Multi-centre Project run by the Paediatric Intensive Care Society.*

A two-year prospective and national survey of all children admitted to paediatric intensive care units with refractory convulsive status epilepticus (RCSE). Inclusion criteria for the study will be all children aged from one month to 16 years with refractory convulsive status epilepticus defined as:

'Children in whom, prior to admission to PICU, the presenting tonic-clonic seizure did not completely stop with benzodiazepine boluses + phenytoin or phenobarbitone or where there is clinical or electrical evidence of a further tonic-clonic seizure within 48 hours of admission to PICU'

All children admitted to a PICU with 'seizure', 'convulsion', 'status epilepticus', 'febrile seizure/convulsion' or 'fit' will be identified or 'flagged up' using the existing PICANet Data Collection form that is in common usage in all intensive care units registered with the PICU Network. Once identified using this form, these children will be then reviewed to see if they meet the defining criteria for RCSE in the above box. Those children that do meet these criteria will then have their data recorded on the questionnaire. The data will be collected centrally by PICANet and will then be forwarded to Dr Appleton at the research centre (Alder Hey). The study is supported by the Paediatric Intensive Care Study Group (PICSG) and the Paediatric Intensive Care Audit Network (PICANet). PICANet are submitting an amendment to their current MREC approval to allow for this additional data collection required for this study. There will be no personal or unit identifiers on the questionnaire, the child will only be identifiable by the PICANet admission number.

List of Ongoing Audits:

1. Retrospective audit of the adherence with the new TBI guideline protocol, & M. Nathan & R. Al-Samsam.
2. Retrospective Study of Children Admitted to PICU for Seizure. P R Govindaraj, D. Pryor, R. Al-Samsam.
3. Retrospective audit of the adherence with the steroids and sepsis local guideline, is there a need to change? Z. Roberts, R. Al-Samsam.

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